UNITED STATES PATENT AND TRADEMARK OFFICE

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EXAMINER
KUMABE, BLAKE K

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

	Application No.	Applicant(s)
Office Action Summary	10/580,792	LIU, BENJAMIN
	Examiner	Art Unit	
	Blake Kumabe	2195	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>11 October 2010</u>.

2a)☒ This action is **FINAL**.   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-14 and 24-30</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-14 and 24-30</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>10/09/2008</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>08/30/2010</u>.

4)☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application

6)☐ Other: _____ .

DETAILED ACTION

1.   Claims 1-14 and 24-30 are pending.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

2.   Claims 8-14 and 24-30 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

3.   Claim 8 recites a virtual machine monitor for changing a first scheduler. However, it appears that the virtual machine monitor would reasonably be interpreted by one of ordinary skill in the art as software per se, failing to be tangibly embodied or include any recited hardware as part of the system. Software alone is directed to a non-statutory subject matter. Applicant is advised to amend the claims to include hardware (e.g. processor and memory for storing the VMM) to overcome the 101 rejection.

4.   Claims 9-14 does not cure the deficiency of parent claim 8. Therefore, they are rejected for the same reason as claim 8 as above.

5.   Claim 24 is rejected to because it recites a "computer readable medium" and the specification lacks antecedent basis for the term. The specification does not define as

to what considered as a "computer readable medium". According to one of an ordinary

skill in the art, a "computer readable medium" includes "storage medium" such as disk,

memory, CD, ROM and RAM, and "transmission medium" such as transmission signal,

carrier wave signal. For the purpose of examination, examiner will consider a

"computer readable medium" as "storage medium" such as disk, memory, CD, ROM

and RAM as on of an ordinary skill in the art. Applicant is advised to amend the claim to

a "computer storage" .

6.   Claims 25-30 does not cure the deficiency of parent claim 24 Therefore, they are

rejected for the same reason as claim 24 as above.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly
> claiming the subject matter which the applicant regards as his invention.

7.   Claims 1-14 and 24-30 are rejected under 35 U.S.C. 112, second paragraph, as

being indefinite for failing to particularly point out and distinctly claim the subject matter

which applicant regards as the invention.

    a. The claim language in the following claims is not clearly understood:

        i.   As per claim 1, it is uncertain what is involved with loading the second

            scheduler (i.e. Is a software image of the scheduler being transferred

            from a remote location? What is the difference between loading and

activating the scheduler? Are there any preliminary steps performed

before the second scheduler is loaded such as 301-305 of Figure 3 of

the specification?).

ii.   Claims 8 and 24 have the same deficiency as claim 1.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

8.   Claims 1, 3-8, 10-14, 24, and 26-30 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Chalmer et al. (US 7,296,271) in view of Applicant Admitted Prior Art,

hereinafter AAPA.

9.   As per claim 1, Chalmer teaches the invention substantially as claimed including

a method for changing a first scheduler in a multitasking system (column 1 lines 48-58;

column 1 lines 62-67), comprising:

loading a second scheduler in the multitasking system (Schedulers may be

swapped out depending on runtime considerations or the situation.) (column 11 lines

34-67; column 12 lines 1-10); and

activating the loaded second scheduler to handle a scheduling request for a scheduling process in place of the first scheduler (A loaded scheduler is activated to run a process when it is invoked by either a periodic interrupt or by a software trap.) (column 5 lines 13-22).

Chalmer does not specifically teach the method for a scheduler in a virtual machine monitor. However, AAPA teaches a scheduler in a virtual machine monitor (¶2).

It would have been obvious to a person of ordinary skill in art at the time of invention was made to incorporate the teaching of Chalmer into the method of AAPA to vary the scheduler based on runtime conditions. The modification would have been obvious because one of ordinary skill in the art would utilize the method of Chalmer because in a single scheduler/multiple algorithm situation, the scheduler may experience significant overhead in connection with determining which scheduling algorithm to run. In contrast, a multiple scheduler technique may avoid such overhead (Chalmer, column 11 lines 47-54).

The combination of Chalmer and AAPA is silent to the virtual machine monitor running when the second scheduler is loaded and activated. However, it would have been obvious to a person of ordinary skill in art at the time of invention was made that the virtual machine monitor is running in order for the scheduler to be changed. The

modification would have been obvious because one of ordinary skill in the art would utilize the running virtual machine monitor to allow interaction with its scheduler. Actions may not be performed on or by a scheduler located in virtual machine monitor unless the virtual machine monitor is running.

10.   As per claim 3, Chalmer teaches wherein the loading further comprises:

unloading the first scheduler from the virtual machine monitor before loading the second scheduler (Only one scheduler is executed at a time. A program counter for a first scheduler is modified to swap the first scheduler for a second scheduler.) (column 1 lines 48-54; column 1 lines 64-67; column 2 lines 1-2).

11.   As per claim 4, Chalmer teaches wherein the activating further comprises:

replacing a first scheduler identifier with a second scheduler identifier to route between the second scheduler and a requester that generated the scheduling request, when the virtual machine monitor is running (When a first scheduler is replaced by a second scheduler, a program counter variable is modified to indicate the second scheduler should be used. A scheduling request will then be routed to use the second scheduler to handle a scheduling process.) (column 2 lines 9-14; column 5 lines 13-22; column 11 lines 34-54).

12.   As per claim 5, Chalmer teaches wherein the activating further comprises:

replacing a first function pointer array pointing to a first function array of the first

scheduler with a second function pointer array pointing to a second function array of the

second scheduler to route between the second scheduler and a requester that

generated the request, when the virtual machine monitor is running (When a first

scheduler is replaced by a second scheduler, a stack pointer is modified to indicate the

second scheduler stack should be used. A scheduling request will then be routed to

use the second scheduler stack to handle a scheduling process.) (column 2 lines 14-19;

column 5 lines 13-22; column 11 lines 34-54).

13.   As per claim 6, Chalmer teaches wherein the activating further comprises:

dynamically patching an address associated with the second scheduler into the

scheduling request when the virtual machine monitor is running (Running a scheduler

includes setting a program counter to an address corresponding the selected scheduler.

A scheduling request will invoke the scheduler corresponding to the address in the

program counter.) (column 1 lines 51-54; column 2 lines 9-14; column 5 lines 13-22).

14.   As per claim 7, Chalmer teaches:

unloading the second scheduler from the virtual machine monitor when the virtual

machine monitor is running; and

re-activating the first scheduler to handle a scheduling request after the second

scheduler has been unloaded (Schedulers can be set to alternate based on runtime

considerations. Schedulers alternating will repeat the unloading and re-activating steps as necessary.) (column 11 lines 38-40).

15.   Claims 8 and 10 recites a virtual machine monitor for changing a first scheduler, comprising the above steps. It has the same limitations of claims 1 and 3, respectively, above and is therefore rejected using the same art and rationale as set forth above.

16.   As per claim 11, Chalmer teaches wherein the activating logic is further to:

replace a first scheduler identifier with a second scheduler identifier;

route between the second scheduler as identified by the second scheduler identifier and a requester that generated the scheduling request, when the virtual machine monitor is running (When a first scheduler is replaced by a second scheduler, a program counter variable is modified to indicate the second scheduler should be used. A scheduling request will then be routed to use the second scheduler to handle a scheduling process.) (column 2 lines 9-14; column 5 lines 13-22; column 11 lines 34-54).

17.   As per claim 12, Chalmer teaches wherein the activating logic is further to:

replace a first function pointer array pointing to a first function array of the first

scheduler with a second function pointer array pointing to a second function array of the

second scheduler;

route between the second function array pointed by the second function pointer

array and a requester that generated the scheduling request, when the virtual machine

monitor is running (When a first scheduler is replaced by a second scheduler, a stack

pointer is modified to indicate the second scheduler stack should be used. A scheduling

request will then be routed to use the second scheduler stack to handle a scheduling

process.) (column 2 lines 14-19; column 5 lines 13-22; column 11 lines 34-54).

18.   Claim 13 recites a virtual machine monitor for changing a first scheduler,

comprising the above steps. It has the same limitations of claim 6 above and is

therefore rejected using the same art and rationale as set forth above.

19.   As per claim 14, Chalmer teaches wherein the loading logic is further to unload

the second scheduler from the virtual machine monitor when the virtual machine

monitor is running; and the activating logic is further to re-activate the first scheduler to

handle a scheduling request after the second scheduler has been unloaded (Schedulers

can be set to alternate based on runtime considerations. Schedulers alternating will

repeat the unloading and re-activating steps as necessary.) (column 11 lines 38-40).

20.   Claims 24 and 26-30 recites a machine readable medium comprising a plurality

of instructions that in response to being executed result in an apparatus, comprising

the above steps. It has the same limitations of claims 1 and 3-7, respectively, above

and is therefore rejected using the same art and rationale as set forth above.

21.   Claims 2, 9, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable

over the combination of Chalmer and AAPA as applied to claims 1, 8, and 24,

respectively, above, and further in view of Knauerhase et al. (US 2005/0198303).

22.   As per claim 2, Chalmer teaches wherein the loading further comprises:

        receiving a scheduler changing request to change the first scheduler (column 1

lines 64-67); and loading the second scheduler in the virtual machine monitor based

upon a scheduler parameter of the scheduler changing request (column 1 lines 59-61).

        Chalmer does not specifically teach ceasing device resources owned by a

running virtual machine in response to receiving a scheduler changing request.

However, ceasing device resources owned by a running virtual machine in response to

receiving a request (¶13 lines 4-5; ¶14 lines 1-13; ¶16 lines 3-5).

        It would have been obvious to a person of ordinary skill in art at the time of

invention was made to incorporate the teaching of Knauerhase into the method of the

combination of Chalmer and AAPA to free the device resources. The modification

would have been obvious because one of ordinary skill in the art would utilize the

ceasing of resources of Knauerhase to allow an operation to complete without

interference from a running virtual machine (¶14 lines 1-13).

23.   Claim 9 recites a virtual machine monitor for changing a first scheduler,

comprising the above steps. It has the same limitations of claim 2 above and is

therefore rejected using the same art and rationale as set forth above.

24.   Claim 25 recites a machine readable medium comprising a plurality of

instructions that in response to being executed result in an apparatus, comprising

the above steps. It has the same limitations of claim 2 above and is therefore rejected

using the same art and rationale as set forth above.

Response to Arguments

25.   Applicant's arguments filed 10/11/2010 have been fully considered but they are

not persuasive.

26.   With regard to the 101 rejections, applicant argues the following points:

        (1) Claims 8-14 seek protection of the hardware implementation and any

combinations of the hardware and software implements for the virtual machine monitor.

Therefore, Applicant believes that claims 8-14 should meet U.S.C. 101 requirement and withdrawal of the present rejection is respectfully requested.

27.   Examiner respectfully disagrees with applicant:

        In response to point (1), it is noted that the features upon which applicant relies (i.e., claims 8-14 seek protection of the hardware implementation and any combinations of the hardware and software implements for the virtual machine monitor) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

28.   With regard to the prior art rejections, applicant argues the following points:

        (1) Loading a second scheduler in the virtual machine monitor, is neither taught nor suggested by the combination of Chalmer and AAPA.

        (2) Loading the scheduler when the virtual machine monitor is running, is neither taught nor suggested by the combination of Chalmer and AAPA.

29.   Examiner respectfully disagrees with applicant:

In response to point (1), the broadest reasonable interpretation of "loading a second scheduler" could include the act of switching a first scheduler by installing a second scheduler selected from a plurality of schedulers. The described use of stack pointers, in Chalmer, is one possible implementation to accomplish the schedule switching. During patent examination, the pending claims must be "given their broadest reasonable interpretation consistent with the specification." In *re Hyatt,* 211 F.3d 1367, 1372, 54 USPQ2d 1664, 1667 (Fed. Cir. 2000). Applicant always has the opportunity to amend the claims during prosecution, and broad interpretation by the examiner reduces the possibility that the claim, once issued, will be interpreted more broadly than is justified. *In re Prater,* 415 F.2d 1393, 1404-05, 162 USPQ 541,550-51 (CCPA 1969).

In response to point (2), the office action on 7/21/2010 states that it would have been obvious to a person of ordinary skill in the art at the time the invention was made that the loading would be performed when the virtual machine monitor is running. Applicant does not provide any arguments to traverse examiner's assertion of obviousness. Further clarification of examiner's assertion of obviousness is described in rejection above. Examiner's assertion of obviousness is supported by Auslander et al. (US 2005/0251806) in paragraphs 18 lines 5-9, 29-30, and 39-44.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Auslander et al. (US 2005/0251806) teaches loading a scheduler in a virtual machine monitor when the virtual machine monitor is running.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Blake Kumabe whose telephone number is 571-270-5593. The examiner can normally be reached on 7:30am - 5:00pm EST Monday to Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng-Ai An can be reached on 571-272-3756. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

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USPTO Customer Service Representative or access to the automated information

system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Meng-Ai An/   /B. K./
Supervisory Patent Examiner, Art Unit 2195   Examiner, Art Unit 2195